

TITLE OF THE INVENTION

**INNER SOLE FOR AN ARTICLE OF FOOTWEAR, AND  
AN ARTICLE OF FOOTWEAR HAVING AN INNER SOLE**

INVENTORS

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AN ARTICLE OF FOOTWEAR HAVING AN INNER SOLE**

**CROSS-REFERENCE TO RELATED APPLICATION**

**[0001]** This application is based upon French Patent Application No. 03:00873, filed January 17, 2003, the disclosure of which is hereby incorporated by reference thereto in its entirety and the priority of which is hereby claimed under 35 U.S.C. §119.

**BACKGROUND OF THE INVENTION**

**1. Field of the Invention**

**[0002]** The present invention relates to a removable inner sole, called insole, having an anti-slip means preventing the latter from sliding inside the boot.

**2. Description of Background and Relevant Information**

**[0003]** U.S. 4,897,937 proposes a solution whereby a base layer is arranged between the inner sole and the bottom of the boot. The base layer has a plurality of projecting elements used to retain the inner sole. Such a solution, in addition to being expensive, because it requires molding an additional piece, is not desirable for use in a mountain boot, ski boot, or skating boot. Indeed, in all of these sports, the footwear element already has multiple sole layers and it is not desirable to add an additional layer. This is especially the case for alpine ski boots in which a flexible liner is inserted. This liner has an outer sole, a lasting sole and an inner sole. The solution, which is to add a base layer to this stacked construction, goes against the search for performance which, to improve the quality of transmission of the forces between the ski and the user, attempts to reduce the number of layers that are inserted.

[0004] In the particular case of ski boots, the problem of the inner sole sliding inside the liner is particularly crucial when taking off the boot. In such a boot, it is very difficult to combine good foot retention, ease of putting on/taking off the boot, and imperviousness. This is why the opening of the boot is often minimal, barely allowing the foot to be inserted into or extracted from the liner; this is particularly true for the front portion of the foot. When the user removes his/her foot, the entire metatarsophalangeal flexion zone remains in contact with the inner sole before it is separated therefrom to continue its upward extraction. In the first part of the extraction of the foot, the latter exerts a downward pressure against the inner sole, and it is pulled rearward at the same time. Depending on the flexibility of the latter, it is turned more or less into an "accordion," making it difficult, or impossible, to put on the boot again. Nevertheless, the inner sole must remain easily removable so that it can be easily dried out of the liner. The use of an anti-slip material based on rubber or similar products is not recommended as they could hinder the extraction or the manual positioning of the sole.

### SUMMARY OF THE INVENTION

[0005] An object of the present invention is to overcome the aforementioned drawbacks and, in particular, to provide a sole equipped with an anti-slip device.

[0006] In a particular embodiment achieving the object of the invention the inner sole includes a lower surface equipped with an anti-slip insert that comprises a piece of abrasive paper.

[0007] Advantageously, the insert is positioned in the metatarsophalangeal flexion zone. Preferably, the sole has a set back zone in which the insert is potentially inserted.

**[0008]** An object of the invention, additionally, is to provide an article of footwear that incorporates an inner sole as described herein.

### BRIEF DESCRIPTION OF THE INVENTION

**[0009]** The invention will be better understood, and other characteristics thereof will become apparent upon reading the following description, to which the drawings are annexed, and wherein:

FIG. 1 is a cross-sectional view of a ski boot having a sole according to the invention; and

FIG. 2 is a bottom view of the inner sole of FIG. 1.

### DETAILED DESCRIPTION OF THE INVENTION

**[0010]** FIG. 1 shows a cross-sectional view of a ski boot 1, although the invention is not intended to be restricted to articles of footwear intended for skiing. The exemplary ski boot has a shell 2 made of plastic material formed by injection molding. Within this shell is inserted an inner comfort element. This inner comfort element takes the form of a liner 3 that is removable. Generally speaking, the liner is constructed of various pieces of fabric or plastic assembled by sewing or gluing to obtain the liner 3. In the example described, the liner has a lasting sole 4, called a Strobel sole, on which the upper is sewn. The Strobel sole 4 can be a fiber-base material offering an upper surface that is not completely smooth.

**[0011]** After the upper has been fixed by sewing to the Strobel sole 4, an outer sole 5 of the liner 3 is glued beneath the Strobel sole 4. This outer sole protects the seams and render them impervious or waterproof.

**[0012]** The inner sole 6, also called an insole, is positioned at the bottom of the liner, in contact with the Strobel sole. It has a felt layer 7, a foam layer 8, and a fabric layer 9 covering the foam layer 8. This particular inner sole construction is not specific, and the invention can be applied irrespective of the construction of the inner sole. The felt layer 7 has a rectangular recess 10 on its lower surface, in the area of the metatarsophalangeal flexion zone. The rectangular shape is not limiting for the embodiment of the invention.

**[0013]** An anti-slip insert 11 is partially housed inside within this recess 10. The anti-slip insert 11, shown in FIG. 2, is constituted by an abrasive paper in the illustrated embodiment. This is a commercially available paper normally used to sand materials that are not very hard, such as wood, plaster, plastic or certain resins. It is constituted of a sheet of paper or of fabric on which a coating having abrasive particles has been arranged.

**[0014]** Advantageously, the abrasive paper ensures anti-slip properties only when a certain pressure is exerted thereon. In the present case, in order for the abrasive paper to really be anti-slip, this pressure must be exerted from top down. This is indeed the case when, during the extraction of the foot from the boot, the projecting portions of the metatarsophalangeal articulation exert a substantial pressure against the inner sole while retreating toward the rear of the liner. Thus, the risk of the inner sole 6 being driven toward the rear to and deform the inner sole into an “accordion” shape is non-existent.

**[0015]** On the other hand, when the user wishes to remove the sole in order to dry it, and when putting it back in place, the anti-slip characteristics of the insert are diminished by the fact that no vertical pressure is then exerted on the inner sole.

**[0016]** In another embodiment of the invention, the abrasive paper is replaced with the coating of an abrasive amalgam made with a paint spray gun or with a brush. In this embodiment, the gluing or sewing of the abrasive insert is avoided.

**[0017]** Furthermore, one can also envision positioning the insert not on the sole but at the bottom of the footwear. A similar result is then obtained.

**[0018]** The invention is not limited to the only embodiment described by way of example, and it can be implemented in all types of boots for which similar problems are to be resolved.

**[0019] NOMENCLATURE**

- 1- Boot
- 2- Shell
- 3- Liner
- 4- Strobel sole
- 5- Outer sole
- 6- Insole
- 7- Felt layer
- 8- Foam layer
- 9- Textile layer
- 10- Recess
- 11- Anti-slip insert